tion point **72** of the first slot portion **68**, and a generally circular aperture defined by the wall **66** at each end **76** of the arcuate slot portion **74**. At least a portion of one of the slots extends through a thickness of the wall **66**. As shown in FIG. **5**, for example, substantially the entire relief slot **64** defined by the wall **66** extends through the thickness of the wall. Preferably, the arcuate slot portion **74** extends bidirectionally from the termination point **72** of the first slot portion **68** in a direction arcing toward the first end **70** of the wall **66**. The arcuate slot portion **74** is illustrated as being generally U-shaped, but can take other configurations without departing from the scope of the present invention.

At the termination point **72** or base of the advanced geometry relief slot **64** the arcuate slot portion **74** is cut instead of a typical hole or ellipse. The tips or ends **76** of the arcuate slot portion **74** are disposed in a region of the wall **66** of the combustion liner **60** that operationally experiences a lower stress field than the termination point **72** or base of the relief slot **64**. The tips or ends **76** of the arcuate slot portion **74** can also be stop drilled to reduce the local Kt.

FIG. **6** is an enlarged view of the relief slot **64** of FIG. **5** illustrating a hoop stress field **80** in the vicinity of the base **72** of the relief slot. As shown in FIG. **6**, the hoop stress field **80** becomes less concentrated at a portion of the wall **66** adjacent to the arcuate slot portion **74** of the relief slot **64**. The reduction in hoop stress field concentration increases crack initiation and fatigue growth life of the region in the wall experiencing the high hoop stress field.

An advanced geometry relief slot in accordance with the present invention can be cut using the current slot creation process or conventional machining processes. The advanced geometry relief slot preferably is processed at the same time that a conventional keyhole relief slot would have been processed. A width of the relief slot can be reduced relative to that of a conventional keyhole relief slot in order to not affect local airflow.

Relief slots are used or required in the aft seal rings of a combustion liner to reduce the hoop stress that occurs at that location. The advanced geometry relief slots embodying the present invention are configured to reduce the very high and very local stress concentrations experienced at the root of a typical keyhole slot by moving the sharp geometric high Kt's out of the local high hoop stress field. The advanced geometry relief slot thus increases crack initiation and fatigue crack growth life of the region in the aft seal ring experiencing the high hoop stress fight. The net result is a combustion liner assembly with improved component fatigue life. This directly translates into a significant life cycle cost reduction because of longer component in-service life.

As will be recognized by those of ordinary skill in the pertinent art, numerous modifications and substitutions can be made to the above-described embodiments of the present invention without departing from the scope of the invention. Accordingly, the preceding portion of this specification is to be taken in an illustrative, as opposed to a limiting sense.

What is claimed is:

1. A structure configured for relieving hoop stress in a wall, the structure comprising a wall being exposed to combustion gases, the wall defining a relief slot including a first slot portion extending from a first end of the wall to a termination point, an arcuate slot portion intersecting the termination point of the first slot portion, and a generally circular aperture defined in the wall at each end of the arcuate slot portion, said generally circular apertures being disposed at regions of the wall between the first end of the wall and the termination point of the first slot portion.

2. A structure as defined in claim **1**, wherein at least a portion of one of the slot portions extends through a thickness of the wall.

3. A structure as defined in claim **1**, wherein the arcuate slot portion extends bidirectionally from the termination point of the first slot portion toward the first end of the wall.

4. A structure as defined in claim **1**, wherein the arcuate slot portion is generally U-shaped.

5. A combustion liner comprising an aft seal ring defining a relief slot in a wall of the combustion liner for relieving hoop stress in the wall, the combustion liner including a first slot portion extending from a first end of the wall to a termination point, an arcuate slot portion intersecting the termination point of the first slot portion, and a generally circular aperture defined in the wall at each end of the arcuate slot portion, said generally circular apertures being disposed at regions of the wall between the first end of the wall and the termination point of the first slot portion.

6. A combustion liner as defined in claim **5**, wherein at least a portion of one of the slot portions extends through a thickness of the wall.

7. A combustion liner as defined in claim **5**, wherein the arcuate slot portion extends bidirectionally from the termination point of the first slot portion toward the first end of the wall.

8. A combustion liner as defined in claim **5**, wherein the arcuate slot portion is generally U-shaped.

9. An aft seal ring of a combustion liner, the combustion liner comprising a wall defining a relief slot for relieving hoop stress in the wall, the wall including a first slot portion extending from a first end of the wall to a termination point, an arcuate slot portion intersecting the termination point of the first slot portion, and a generally circular aperture defined in the wall at each end of the arcuate slot portion, said generally circular apertures being disposed at regions of the wall between the first end of the wall and the termination point of the first slot portion.

10. An aft seal ring as defined in claim **9**, wherein at least a portion of one of the slot portions extends through a thickness of the wall.

11. An aft seal ring as defined in claim **9**, wherein the arcuate slot portion extends bidirectionally from the termination point of the first slot portion toward the first end of the wall.

12. An aft seal ring as defined in claim **9**, wherein the arcuate slot portion is generally U-shaped.

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